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gap having a configuration which results in said inductance of said choke changing with an output current of the welder without saturation in said air gap thereby eliminating inflection points during operation of said welder.

41. The output choke as defined in claim 40, wherein both of said middle portions being substantially V-shaped.

42. The output choke as defined in claim 40, wherein both of said middle portions forming a diamond shaped air gap that is substantially symmetrical.

43. The output choke as defined in claim 41, wherein both of said middle portions forming a diamond shaped air gap that is substantially symmetrical.

44. The output choke as defined in claim 41, wherein both of said middle portions forming a diamond shaped air gap that is non-symmetrical.

45. The output choke as defined in claim 40, wherein said air gap is at least partially filled with a low permeability material.

46. The output choke as defined in claim 40, wherein said at least a portion of the middle portion of said corresponding end surfaces being spaced apart at a varying distance to substantially gradually vary the inductance of said choke over a current range.

47. The output choke as defined in claim 46, wherein said inductance of said choke at least partially varies generally inversely proportional to said weld current.

48. The output choke as defined in claim 46, wherein said inductance of said choke at least partially varies in a generally straight line to said weld current.



49. The output choke as defined in claim 46, wherein said inductance of said choke at least partially varies in curvilinearly to said weld current.

50. The output choke as defined in claim 46, wherein said inner edges of said pole pieces contact one another.

51. The output choke as defined in claim 46, wherein said outer edges of said pole pieces contact one another.

52. The output choke as defined in claim 50, wherein said outer edges of said pole pieces contact one another.

53. The output choke as defined in claim 46, wherein said end surfaces are spaced from one another.

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54. The output choke as defined in claim 53, wherein said inner and outer edges of said

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end surfaces of said first and second pole pieces being spaced apart at substantially the same distance.

55. The output choke as defined in claim 46, wherein said at least one winding and said core having a sufficient size to prevent saturation at a weld current of at least about 100 amperes.

56. The output choke as defined in claim 46, wherein said middle portions having substantially non-perpendicular oriented surfaces.

57. The output choke as defined in claim 46, wherein said air gap having a converging width that at least partially converges toward said inner and outer edges, at least a portion of said air gap having a width that is greater than the spacing between the inner and outer edges of said first and second pole pieces.

58. An output choke for a D.C. arc welder having an inductance and adapted to include at least one winding for conducting current, said output choke comprising a high permeability core having first and second pole pieces and an inductance controlling air gap, said air gap defined by an end surface on said first and second pole pieces, at least a portion of said end surfaces of said first and second pole pieces being spaced from one another and facing one another, said end surfaces of said first and second pole pieces each having an inner and outer edges and a middle portion between said inner and outer edges, at least a portion of the middle portion of said corresponding end surfaces being spaced apart at a varying distance to vary the inductance of said choke over a current range,

said air gap having a converging width that at least partially converges toward said inner and outer
10 edges, at least a portion of said air gap having a width that is greater than the spacing between the
inner and outer edges of said first and second pole pieces, said middle portions having a
configuration to substantially prevent inflection points along a saturation curve of said choke.

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59. The output choke as defined in claim 58, wherein said end surfaces of said pole pieces
each having a middle portion positioned between said outer edges, said middle portions having
substantially non-perpendicular oriented surfaces.

60. The output choke as defined in claim 58, wherein each of said end surfaces has a
cross-sectional shape, said cross-sectional shape of said end surfaces being substantially
symmetrical.

61. The output choke as defined in claim 58, wherein each of said end surfaces has a
cross-sectional shape, said cross-sectional shape of said end surfaces being non-symmetrical.

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62. The output choke as defined in claim 58, wherein at least of said middle portions
being substantially V-shaped.

63. The output choke as defined in claim 62, wherein said air gap between said end
surfaces is substantially diamond shaped.

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64. The output choke as defined in claim 58, wherein at least of said middle portions being substantially arcuate shaped.

65. The output choke as defined in claim 64, wherein said air gap between said end surfaces is substantially oval shaped.

66. The output choke as defined in claim 58, wherein said air gap is at least partially filled with a low permeability material.

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67. The output choke as defined in claim 58, wherein said winding and said core having a size to prevent saturation at a weld current of at least about 100 amperes.

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68. The output choke as defined in claim 58, wherein said at least a portion of the middle portion of said corresponding end surfaces being spaced apart at a varying distance to substantially gradually vary the inductance of said choke over a current range.

69. The output choke as defined in claim 68, wherein said inductance of said choke at least partially varies generally inversely proportional to said weld current.

70. The output choke as defined in claim 68, wherein said inductance of said choke at least partially varies in a generally straight line to said weld current.
